

### AMENDMENTS TO THE SPECIFICATION:

Please amend the specification as is indicated below.

Please amend paragraph [0028] as indicated below:

[0028] One advantageous PVD method of depositing core layer 20 or upper cladding layer 30 uses radio frequency (RF) sputtering with a wide area target. An apparatus for RF sputtering with a wide area target is shown in FIG. 3. The method and apparatus are described in commonly assigned U.S. application serial Nos. 09/633,307, ~~(the '307 application,)~~ (the '307 application, now abandoned) and ~~Attorney Docket No. M 7637 1P US~~ U.S. Patent No. 6,506,289, which is a continuation-in-part and claims priority to the '307 application. Both the '307 application and the '289 patent are herein incorporated by reference in their entirety. - ~~which are incorporated herein by reference.~~ For deposition of core layer 20, the ridge structured lower cladding layer, as in FIG. 1A, is positioned opposite a wide area sputter source target 52. The ridge structured lower cladding layer is depicted as substrate 56 in FIG. 3. (For deposition of upper cladding layer 30, the structure of FIG. 1B, including core layer 20, is positioned as substrate 56.)

Please amend paragraph [0044] as indicated below:

[0044] A core layer 20, in which alumina serves as the host for a small percentage of rare earth elements can be prepared by reactive DC sputtering of an alloy target composed of aluminum and the rare earth and other elements. Similarly, a mixture of silica and alumina, which is a beneficial host for rare earth doped core layer 20, can be prepared by reactive DC sputtering of an alloy target composed of silicon, aluminum, and the rare earth and/or other dopants. The alloy targets can be fabricated by conventional powdered metallurgical techniques. A method of pulsed DC sputtering with a wide area target is described in commonly assigned U.S. patent ~~application serial No. 09/766,463, (the '463 application)~~ no. 6,533,907 (the '907 patent), which is incorporated herein by reference in its entirety. Example 3 demonstrates deposition of alumina by reactive pulsed DC sputtering using a pulsed DC power supply with a controllable pulse profile in place of the switching power supply of the ~~'463 application~~ '907 patent.

Please amend paragraph [0049] as indicated below:

[0049] As described above, when sputtering including substrate bias is used to deposit the core layer of a structure having a ridge 11 of height  $H$  that is greater than twice the core thickness  $T$ , there is some separation between the core layer 22 and the slab layer 25. According to the model calculations, for differences in refractive index between core and cladding layers characteristic of practical devices, the ratio of the height  $H_{\min}$  to the thickness  $T$  is typically greater than 1 and less than 2. The criterion for separation of core and slab layers by bias sputtering of  $H > 2T$  ensures the center of the core is separated from the slab layer by more than the radius  $R_{1/e}$ . As described above, bias sputtering provides films with superior material properties for use in optical devices. Also, as long as the thickness of any core material on the sidewalls of the ridge is less than  $T$ , the core material on the sidewalls will not support single mode propagation. From these considerations, an advantageous lighthouse waveguide is obtained when bias sputtering is used to deposit a core layer of thickness  $T$  on a ridge structure of height  $H$  for structures where  $H$  is greater than  $T$  or greater than  $1.5 T$ . A further advantage is obtained when bias sputtering is used for deposition of core material of thickness  $T$  on a ridge structure with a sidewall angle in the intermediate range of between ~~[[and]]~~ about 30 and about 45 degrees and a height  $H$  greater than  $2T$ , to produce a lighthouse waveguide structure with a complete separation between the core portion and the slab portion.